## IN THE CLAIMS

The following claim set replaces any prior versions of the claims.

1	1. (withdrawn) A method for making a tunnel valve head with a flux
2	guide, comprising:
3	forming a tunnel valve at a first shield layer, the tunnel valve
4	comprising a free layer distal to the first shield layer;
5	depositing a first insulation layer over the first shield layer and around
6	the tunnel valve;
7	depositing a flux guide over the first insulation layer and coupling to
8	the tunnel valve at the free layer;
9	covering the flux guide with a second insulation layer; and
10	forming a second shield layer over the second insulation, wherein the
11	flux guide and the free layer are physically isolated by the first and second insulation
12	layers to prevent current shunts therefrom.
1	2. (withdrawn) The method of claim 1 wherein the depositing the first
2	insulation layer over the first shield layer and around the tunnel valve is performed
3	using a self-aligning process wherein regions of different thicknesses are formed with
4	a single masking step.
1	3. (withdrawn) The method of claim 1 wherein the flux guide is
2	physically connected to the free layer of the tunnel valve.
1	4. (withdrawn) The method of claim 1 wherein the covering the flux
2	guide with a second insulation layer is performed using a self-aligning process
3	wherein regions of different thicknesses are formed with a single masking step.
1	5. (withdrawn) The method of claim 1 wherein the flux guide increases
2	the amount of magnetic flux in the tunnel valve.

1	6. (withdrawn) The method of claim 1 wherein the increase in the
2	amount of magnetic flux in the tunnel valve enhances the outptu signal fo the tunnel
3	valve.
1	7. (withdrawn) The method of claim 1 wherein the forming a tunnel
2	valve at a first shield layer further comprises:
3	forming an antiferromagnetic (AFM) layer of electrically insulating
4	antiferromagnetic material;
5	depositing a pinned layer of ferromagnetic material in contact with
6	said AFM layer, said pinned layer making electrical contact with said first shield;
7	forming a free layer of ferromagnetic material; and
8	forming a tunnel junction layer of electrically insulating material
9	between said pinned and free layers.
1	8. (currently amended) A tunnel valve sensor, comprising:
2	a tunnel valve disposed at a first shield layer, the tunnel valve
3	comprising a free layer distal to the first shield layer;
4	a first insulation layer formed over the first shield layer and abutting
5	the sides of around the tunnel valve;
6	a flux guide deposited over the first insulation layer and onto a portion
7	of a first and second side of the tunnel vale, the flux guide being coupled to making
8	contact with the tunnel valve at the free layer only on the first and second sides of the
9	tunnel valve with a gap therebetween;
10	a second insulation layer covering disposed over the flux guide and
11	onto only a portion of the tunnel valve to encapsulate the flux guide and to leave a
12	portion of the tunnel valve exposed; and
13	a second shield layer deposited over the second insulation, wherein the
14	flux guide and the free layer are physically connected, and the flux guide is physically
15	isolated from the first and second shield layers by the first and second insulation
16	layers to prevent current shunts therefrom.

1	9. (canceled) The tunnel valve sensor of claim 8 wherein the flux guide
2	is physically connected to the free layer of the tunnel valve.
1	10. (original) The tunnel valve sensor of claim 8 wherein the flux guide
2	increases the amount of magnetic flux in the tunnel valve.
1	11. (previously presented) The tunnel valve sensor of claim 10 wherein
2	the increase in the amount of magnetic flux in the tunnel valve enhances the output
3	signal of the tunnel valve.
1	12. (currently amended) The tunnel valve sensor of claim 8 wherein the
2	tunnel valve further comprises:
3	an antiferromagnetic (AFM) layer of electrically insulating
4	antiferromagnetic material;
5	a pinned layer of ferromagnetic material in contact with said AFM
6	layer, said pinned layer making electrical contact with said first shield;
7	a free layer of ferromagnetic material; and
8	a tunnel junction layer of electrically insulating material disposed
9	between said pinned and free layers.

1	13. (currently amended) A magnetic storage system, comprising:
2	a magnetic recording medium;
3	a tunnel valve sensor disposed proximate the recording medium, the
4	tunnel valve sensor, comprising
5	a tunnel valve disposed at a first shield layer, the tunnel valve
6	comprising a free layer distal to the first shield layer;
7	a first insulation layer formed over the first shield layer and
8	abutting the sides of around the tunnel valve;
9	a flux guide deposited over the first insulation layer and onto a
10	portion of a first and second side of the tunnel vale, the flux guide being coupled to
11	making contact with the tunnel valve at the free layer only on the first and second
12	sides of the tunnel valve with a gap therebetween;
13	a second insulation layer covering disposed over the flux guide
14	and onto only a portion of the tunnel valve to encapsulate the flux guide and to leave a
15	portion of the tunnel valve exposed; and
16	a second shield layer deposited over the second insulation,
17	wherein the flux guide and the free layer are physically connected, and the flux guide
18	is physically isolated from the first and second shield layers by the first and second
19	insulation layers to prevent current shunts therefrom.
20	an actuator for moving the tunnel valve sensor across the magnetic
21	recording disk so the tunnel valve sensor may access different regions of magnetically
22	recorded data on the magnetic recording medium; and
23	a data channel coupled electrically to the tunnel valve sensor for
24	detecting changes in resistance of the tunnel valve sensor caused by rotation of the
25	magnetization axis of the free ferromagnetic layer relative to the fixed magnetization
26	of the pinned layer in response to magnetic fields from the magnetically recorded
27	data.
1	14. (canceled) The magnetic storage system of claim 13 wherein the flux
2	guide is physically connected to the free layer of the tunnel valve.

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15. (original) The magnetic storage system of claim 13 wherein the flux
guide increases the amount of magnetic flux in the tunnel valve.
16. (previously presented) The magnetic storage system of claim 15
wherein the increase in the amount of magnetic flux in the tunnel valve enhances the
output signal of the tunnel valve.
17. (original) The magnetic storage system of claim 13 wherein the tunnel
valve further comprises:
an antiferromagnetic (AFM) layer of electrically insulating
antiferromagnetic material;
a pinned layer of ferromagnetic material in contact with said AFM
layer, said pinned layer making electrical contact with said first shield;
a free layer of ferromagnetic material; and
a tunnel junction layer of electrically insulating material disposed
between said pinned and free layers.